What Is Claimed Is:

1. A method of crystallizing amorphous silicon, comprising:

forming an amorphous silicon film over a substrate;

crystallizing the amorphous silicon film to form a polycrystalline silicon film using a sequential lateral solidification crystallization method; and

performing a surface treatment to the polycrystalline silicon film,

wherein the sequential lateral solidification crystallization method includes at least a first application of a first laser beam having a first energy density that completely melts a first uncrystallized portion of the amorphous silicon film and melts a first crystallized portion of the amorphous silicon film, and the surface treatment includes application of a second laser beam having a second energy density that partially melts an entire surface of the polycrystalline silicon film.

2. The method according to claim 1, wherein the application of the first laser beam that completely melts the first uncrystallized portion of the amorphous silicon film forms a plurality of seeds along border regions between solid and liquid phases of the amorphous silicon.

3. The method according to claim 2, wherein the first uncrystallized portion of the amorphous silicon is crystallized within a second region along a direction from the border regions toward a center portion of the first uncrystallized region using the plurality of seeds as nucleation cites during the application of the first laser beam.

4. The method according to claim 3, wherein the second region includes a plurality of first sub-grains having a first size and a plurality of first sub-grain boundaries.

5. The method according to claim 4, wherein the sequential lateral solidification crystallization method includes at least a second application of the first laser beam that grows the first sub-grains to form a plurality of second sub-grains having a second size greater than the first size.

6. The method according to claim 5, wherein a first group of the second sub-grains grow along a first direction to contact a second group of the second sub-grains that grow along a second direction substantially opposite to the first direction, and wherein the first and second groups of second sub-grains form a second sub-grain boundary.

7. The method according to claim 6, wherein the plurality of first sub-grain boundaries are disposed among the plurality of first sub-grains and among the plurality of second sub-grains, and wherein the plurality of first sub-grain boundaries and the second sub-grain boundary include a plurality of particles.

8. The method according to claim 7, wherein the application of the second laser beam partially melts and re-crystallizes the polysilicon film and removes the plurality of particles.

9. The method according to claim 8, wherein the surface treatment maintains polycrystalline characteristics of the plurality of second sub-grains.

10. The method according to claim 9, wherein the surface treatment forms a new grain boundary within a region where the first and second groups of second sub-grains directly contacts each other.

11. The method according to claim 1, wherein the first laser beam has a beam width of about 2 to 3 micrometers.

12. The method according to claim 1, wherein the surface treatment is performed within a vacuum chamber.

13. The method according to claim 12, wherein the vacuum chamber includes inert gas.

14. The method according to claim 12, wherein the vacuum chamber includes a dielectric window on a top portion of the vacuum chamber and a stage within an interior of the vacuum chamber.

15. The method according to claim 14, wherein the dielectric window provides an air/vacuum tight seal with the vacuum chamber, and the substrate is disposed on the stage.

16. The method according to claim 12, further comprising:

disposing the polycrystalline silicon film formed by the first laser beam over the stage of the vacuum chamber; and

applying the second laser beam along an entire surface of the polycrystalline silicon film disposed in the vacuum chamber.

17. The method according to claim 16, wherein the application of the second laser beam is through the dielectric window of the vacuum chamber.

18. A display device including a plurality of thin transistors formed using the method according to claim 1.

19. A liquid crystal display panel including a plurality of thin transistors formed using the method according to claim 1.